# Development of Video-Based

# and

# Other Automated
# Traffic Data Collection Methods

# Traffic Tracker Manual

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At the University of Idaho

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# CHAPTER ONE
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# CHAPTER ONE
# Getting Started with Traffic Tracker

## 1.1 Overview of Traffic Tracker

*Traffic Tracker* is a software program that enables you to collect and analyze time-based traffic flow data. The program allows you to design a data collection screen that is a graphical representation of the location where you are collecting data. During the data collection process, you press a number or letter key (called a trigger) on the keyboard each time a particular traffic event occurs. Each time you press a trigger key, the current time is recorded in a data file. The key that you pressed is also recorded in the data file, so that you can distinguish between separate events. Once you have collected data using *Traffic Tracker*, you can analyze the data in a variety of ways.

*Traffic Tracker* consists of three components. You design data collection screens (called Environments) in the *Environment Editor*. You use these screens to collect data using the *Data Collector*. You then analyze the data using the *Analysis Package*.

## 1.2 system requirements for using Traffic Tracker

***Software***: Your computer must have one of the following operating systems installed: *Windows 98, Windows NT, Windows 2000, Windows ME*, or *Windows XP*.
*Traffic Tracker* will perform a wide range of basic analysis functions on your traffic flow data. If you want to perform further analysis, you will need to have a spreadsheet such as *Excel* or *Access* installed.

***Hardware***: Your computer must be equipped with a minimum 200 MHz processor and 32 Mb of ram.

## 1.3 Installing Traffic Tracker

The *Traffic Tracker* Installation CD contains five files:

- Setup.exe
- SETUP.LST
- Traffic Tracker.CAB

- Traffic Tracker User Manual
- ReadMe

To begin the installation process, double-click on Setup.exe. You will enter the standard Windows installation program. Follow the clear and simple instructions to install *Traffic Tracker*. When installation is complete, you will see the following screen (Figure 1.1). Click "OK." *Traffic Tracker* will now appear in your START menu.

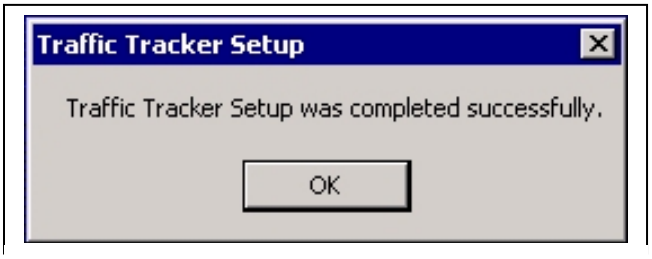


***Figure 1.1 Traffic Tracker was installed successfully on your computer. Click OK.***

## *1.4 Accessing Traffic Tracker's Functions*

When you click *Traffic Tracker* on the START menu, the main *Traffic Tracker* screen will display (Figure 1.2). All of *Traffic Tracker*'s functions are accessed from this screen. You must exit one function and return to this screen in order to enter another function.

The first link, "About *Traffic Tracker,*" provides basic information about the program and its history. The second link, "*Traffic Tracker Help*," accesses the program's online help system. The next four links, "Create an Environment," "Edit an Environment," "Collect Data," and "Analyze Your Data," allow you to access each of the program's functions.

***Figure 1.2. Traffic Tracker's main screen.***

## *1.5 GETTING HELP WITH TRAFFIC TRACKER*

There are two ways to get help in using *Traffic Tracker:*

1. *User Manual*. This manual illustrates how to use *Traffic Tracker* by providing step-by-step instructions for collecting and summarizing three kinds of traffic data:
    - Flow rates
    - Delays
    - Speeds

2. *Online Help*. The *Traffic Tracker* online help system is available from within the program (select Help from the main menu or from within each program function screen). *Traffic Tracker*'s online help system provides an in-depth look at each of the program's functions and features as well as answers to specific questions.

If, after reading the manual and using the online help system, you still have problems with the program, contact NIATT at the University of Idaho: niatt@uidaho.edu or 208/885-0576.

## 1.6 Using this Manual

***Chapter 1*** introduces *Traffic Tracker*. It provides an overview of the program, lists the system requirements for using the program, describes how to install the *Traffic Tracker* software and access *Traffic Tracker*'s functions, and explains how to get help for using the program.

***Chapter 2*** describes how to use the program's *Environment Editor*.

***Chapter 3*** describes how to use the program's *Data Collector*.

***Chapter 4*** describes how to use the program's *Analysis Package.*

# CHAPTER TWO
## Creating a Data Collection Environment with the Environment Editor

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# CHAPTER TWO
## Creating a Data Collection Environment with the Environment Editor

### 2.1 Introduction

A data collection environment is a drawing that represents the real traffic environment in which you will be collecting data. This graphic representation greatly simplifies and clarifies the data collection process, whether you are working out in the field in a traffic situation or in the office viewing a videotape.

In your data collection environment, you can place lines representing roadway elements, text describing the environment, and graphic elements called data collectors. Data collectors are symbols that you place in your drawing in the locations where you want to record events. When you place a data collector in your environment, you assign a "trigger" key to that data collector. Whenever you press that trigger key during the data collection process, the data collector records the current time and the key that you pressed.

You can choose to create a unique environment for each data collection situation, or you can modify one of the pre-drawn templates provided in *Traffic Tracker*.

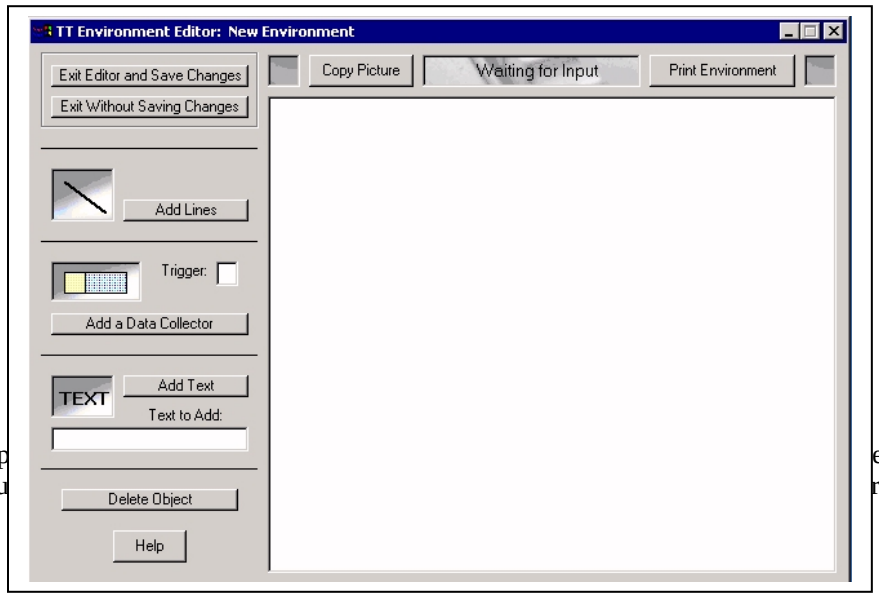
### 2.2 Open an Environment

If you want to create a new, unique environment, select "Create an Environment" from the main *Traffic Tracker* screen (Figure 2.1).

If you prefer to not start from scratch creating an environment, *Traffic Tracker* contains five templates with pre-drawn environments. You can use these templates as they are, or you can modify them to fit your needs. To access the templates, click "Edit an Environment" (Figure 2.1).

Select the tem

Whether you choose to create a new environment or edit an existing environment, *Traffic Tracker*'s *Environment Editor* screen will display next (Figure 2.3).




Once you've op e graphic elements in you reen.

## *2.3 Place graphic elements*

### *2.3.1. Add lines*

To add lines to the environment, click the "Add Lines" button (Figure 2.4) and point to the starting position for your line. Holding the button down, drag the mouse to the desired end point and release the button. The line will appear on the environment. Once you've clicked "Add Lines," you can draw multiple lines on the environment without clicking the button each time.

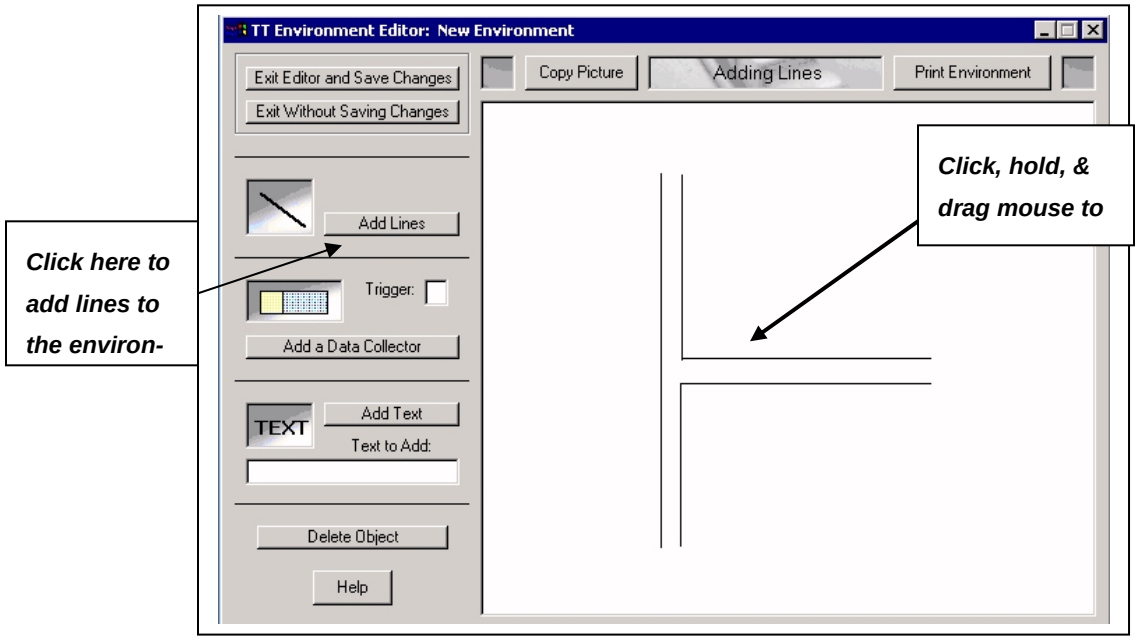



***Figure 2.4. Add lines to the environment.***

### 2.3.2 Add data collectors

Data collectors are symbols that you add to your data collection environment in the locations where you want to record events. They respond to specific keys pressed by the user during data collection, and record in a data file the current time and the key that was pressed. Each data collector displays a running total onscreen of the number of events recorded at that location during the data collection process.

To add data collectors to the environment, first enter a "trigger" key in the blank field shown (Figure 2.5). The trigger is the key on the keyboard that identifies a specific data collector. It is also the key that causes the data collector to add entries to the data file. Each data collector can have only one unique trigger key. Triggers can be letters or numbers, they can only be one digit, and they are case-sensitive.

After you have entered the trigger for the first data collector, click "Add a Data Collector," point to the location where you want to place the collector, and click. The data collector will appear on the environment. It is a good idea to add descriptive text labels to your data collectors (see next section). You may add as many data collectors to your environment as you wish.

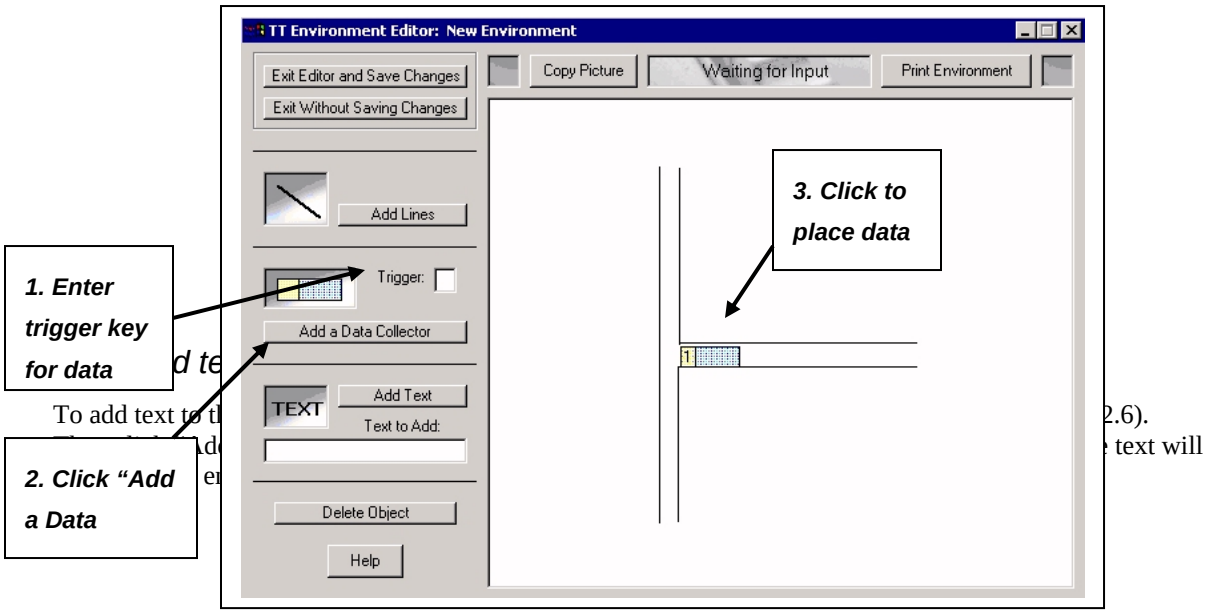



***Figure 2.5. Add triggers and data collectors to the environment.***

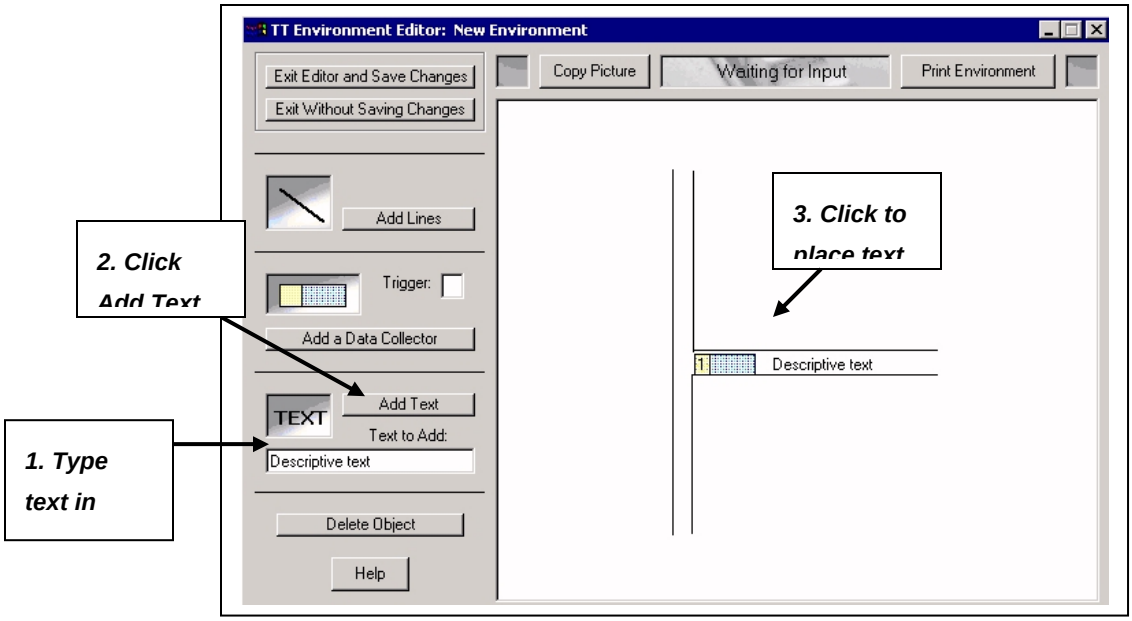



***Figure 2.6. Add descriptive text to the environment.***

## *2.4 Other Features*

### *2.4.1 Delete object*

If you want to move or change a line, data collector, or text box, you must delete it and re-enter it on the environment. To do this, click "Delete Object," point to
the object (Figure 2.7), and click. The object will disappear. Then re-place the item.

### *2.4.2 Copy picture*

You can generate a picture of your environment and send it to the Clipboard by clicking the "Copy Picture" button (Figure 2.7). You can then paste your picture into MS Word or other programs using the paste command.

### *2.4.32 Print environment*

You can print a copy of your data collection environment by clicking the Print Environment button (Figure 2.7).

### *2.4.4 Save your environment*

To save your environment, click the "Exit Editor and Save Changes" button (Figure 2.7). You will be asked to name this environment before the program saves the file. To discard your work, click "Exit Without Saving Changes."

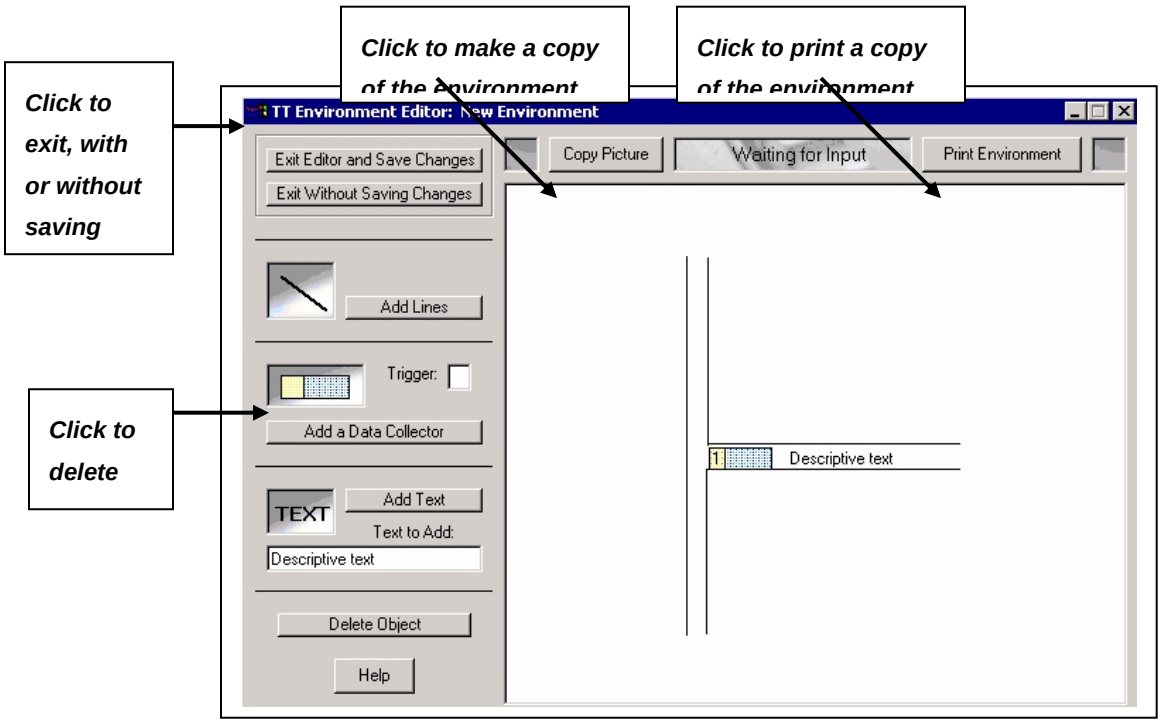



***Figure 2.7. Other features of Traffic Tracker's Environment Editor.***

After clicking either Save button, you will exit the Environment Editor and return to *Traffic Tracker*'s main screen.

# CHAPTER THREE

## Collecting Traffic Data with the Data Collector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# CHAPTER THREE

## Collecting Traffic Data with the Data Collector

### 3.1 Introduction

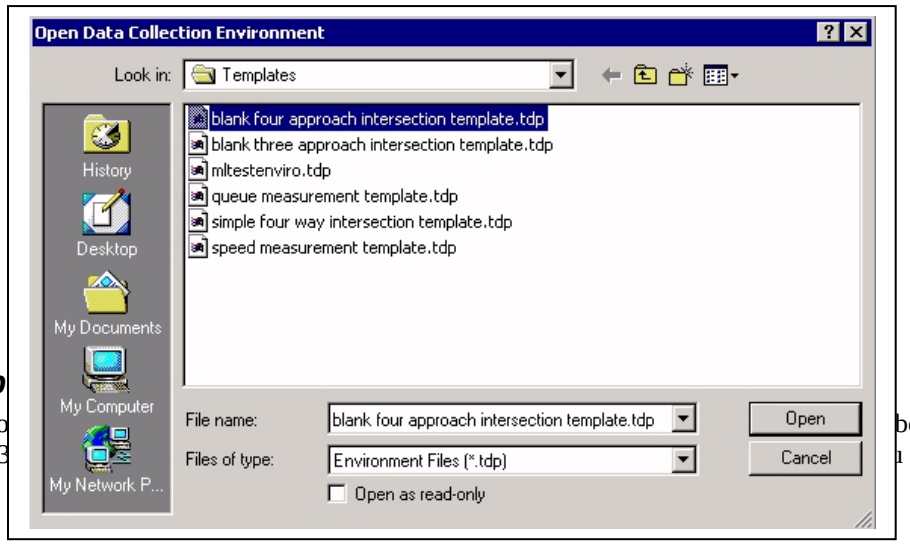
Once you have set up your data collection environment, you are ready to begin data collection. When an event occurs, such as a car leaving the stop bar at an intersection, press the appropriate trigger key on the keyboard and the time that the event occurred will be recorded in a data file. The key that you pressed will also be recorded, so you can keep track of multiple types of events. Each data collector will display a running total onscreen of the number of events that have been recorded at that location.

### 3.2 Open Data Collector

To open *Traffic Tracker*'s data collection function, click "Collect Data" on the program's main screen (Figure 3.1).

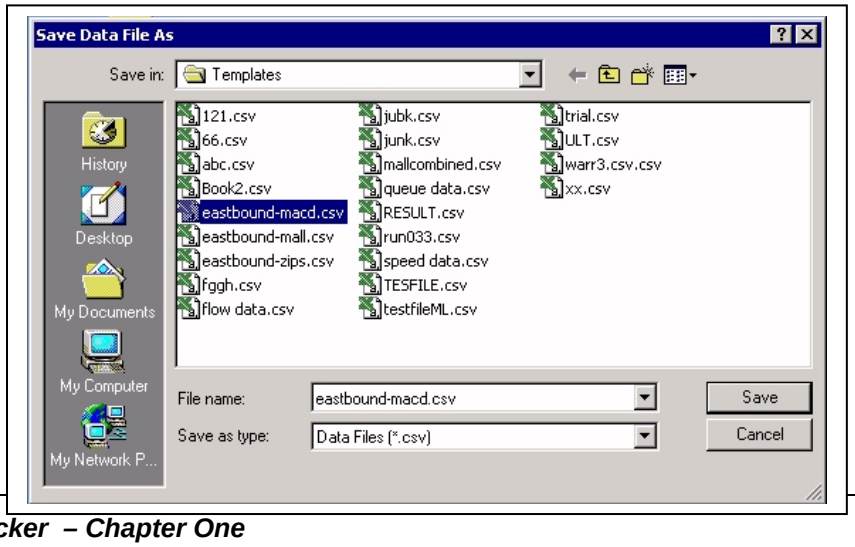
### 3.3 Select an environment

You will first be asked to select a data collection environment, either a pre-drawn template or an environment that you have created (Figure 3.2). Select an environment and click "Open."




### 3.4 Sp

When yo bout to collect
(Figure 3 desire. Click
"Save."



## *3.5 using the Data Collector screen*

When you click "Save," *Traffic Tracker*'s *Data Collector* screen will open, displaying the environment that you selected (Figure 3.4).

Before you begin data collection, first designate a start time in the "Start Time" field. Using the hh:mm:ss format (hours, minutes, seconds), enter the current time or any other time, and the data will be referenced to the time that you provide. For example, if you are collecting data from a videotape, you might want to enter the start time of the videotape so the data will be properly referenced. For this example, we have entered a start time of 1:23 pm. Be sure to enter the time using a 24 hour clock (midnight is shown as 0000, 6am shown as 0600, noon shown as 1200, 6pm shown as 1800).

You are now ready to begin data collection. Click the **Start/Pause** button to begin data collection and click again to pause collection. The timer will begin counting when you click **Start/Pause** and stop when you click the button a second time. (Hint: If you are collecting data from a videotape, be sure to pause the videotape every time you pause the data collector.)

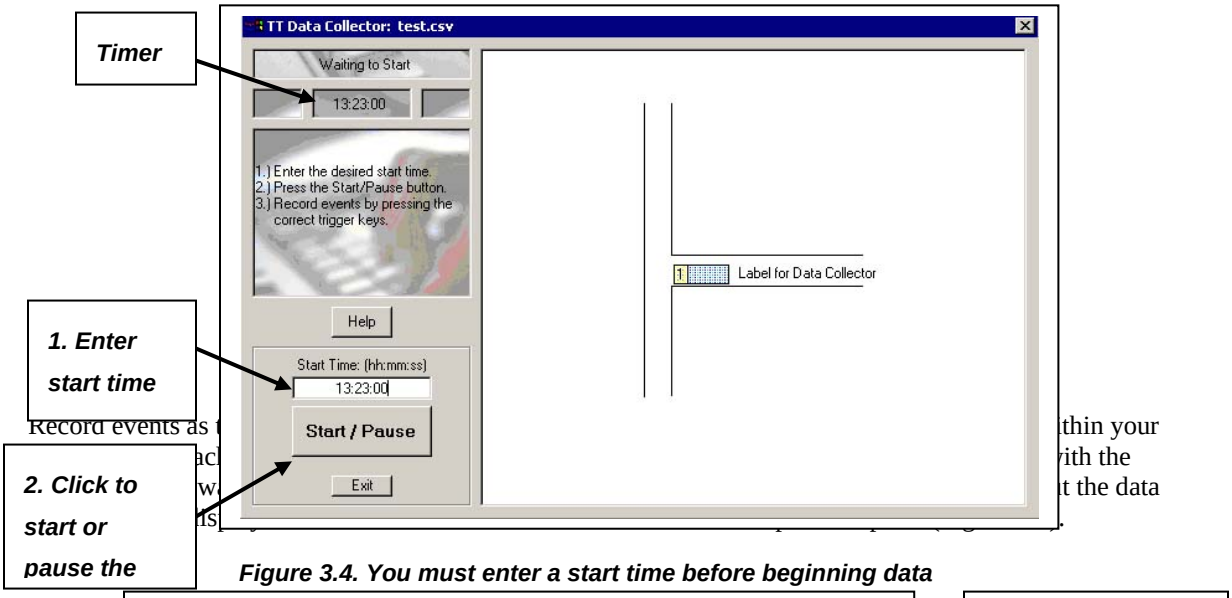



***Figure 3.4. You must enter a start time before beginning data***

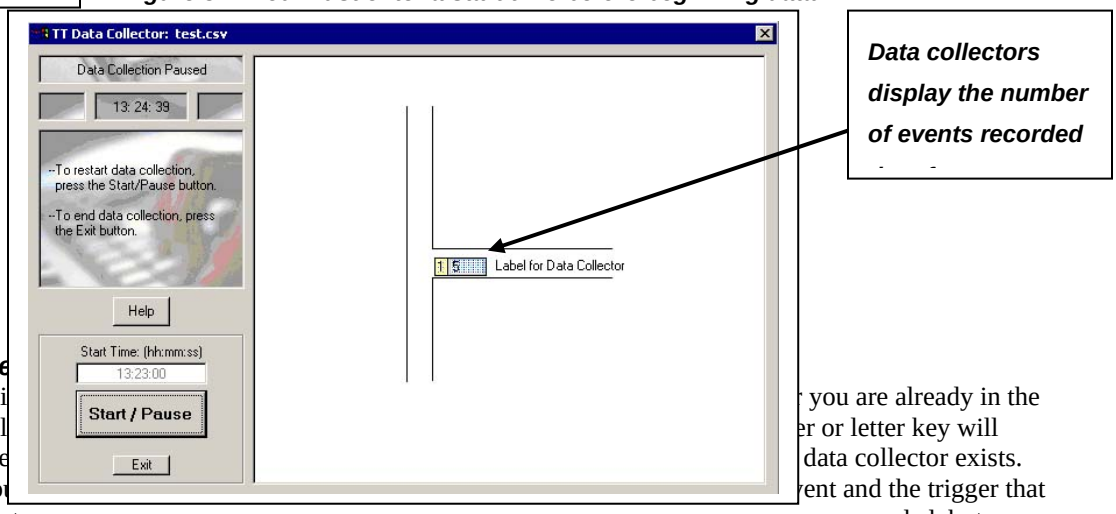



***Figure 3.5. Press corresponding trigger key each time an event occurs.***

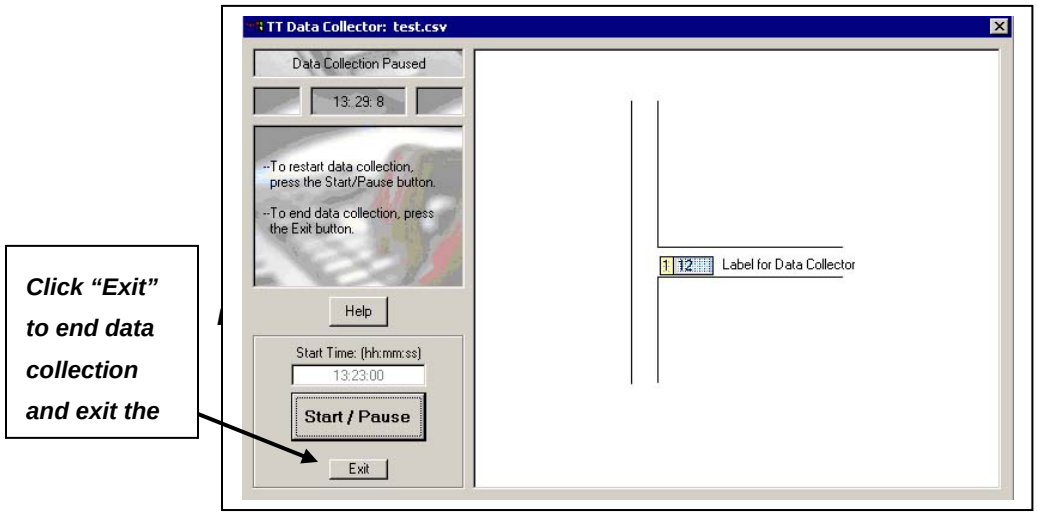
For example, suppose you decide at the last minute that you want to record the number of large trucks that are turning right. You might decide to use the letter “T” as your trigger and press “T” whenever a large truck turns right.

### *3.5.2 Synchronizing multiple users during data collection*

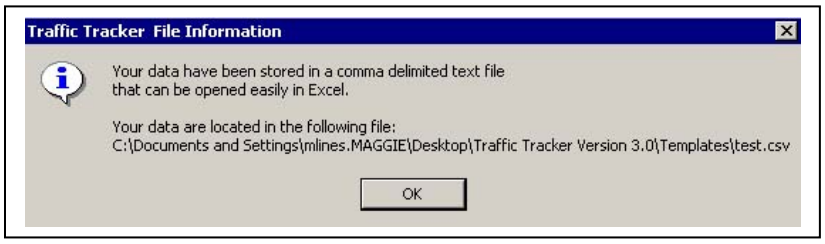
There may be a project that requires more than one person to participate in the data collection process. For this situation, develop data collection environments for each user and make sure that each environment uses unique trigger keys. Set the start time for each user to the same time and have everyone press the **Start/Pause** button at the same time. Multiple data files can be merged into one file in *Traffic Tracker*'s *Analysis Package*, making it easy to analyze them all.

## *3.6 Exit the Data Collector*

When you are finished with data collection, click "Exit" (Figure 3.6). Your data will be saved in a comma-delimited text file, with the extension ".csv."



You will then be notified where your data has been stored (Figure 3.7). Click “OK” to exit the *Data Collector* and return to the main *Traffic Tracker* screen.



# CHAPTER FOUR

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# CHAPTER FOUR

## Analyzing your Data with the Analysis Package

### 4.1 Introduction

Once you have collected event data, you can use *Traffic Tracker*'s *Analysis Package* to extract and analyze the values that interest you. The *Analysis Package* allows you to analyze data in a variety of ways, but the program also features three mini-wizards that greatly simplify the determination of flow rate, delay, and speeds.

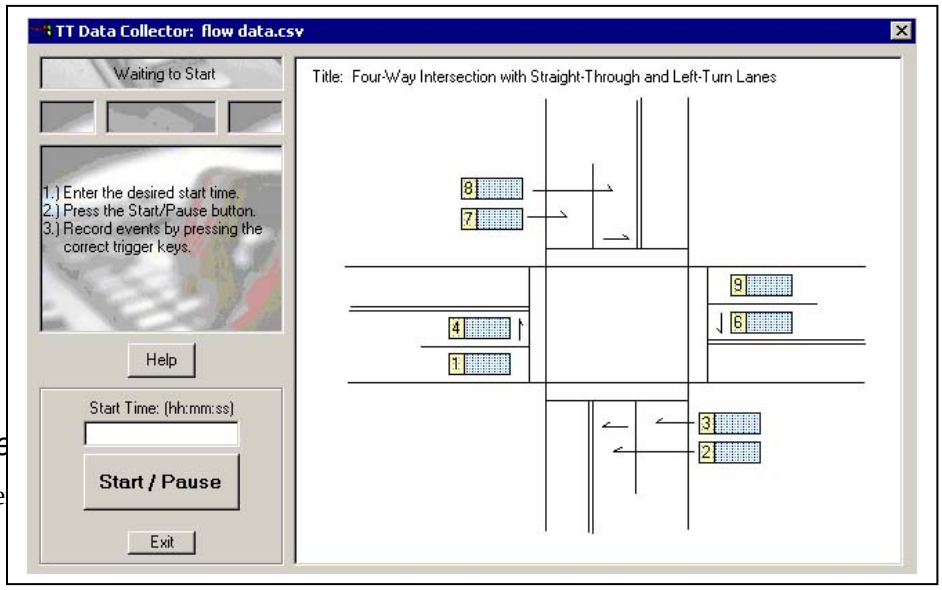
This chapter will describe how to use these mini-wizards in the context of three example intersections. Turn to the following sections of this chapter for specific instructions on using each of the mini-wizards:

Section 4.2 – Determining Flow Rates
Section 4.3 – Determining Delays
Section 4.4 – Determining Vehicle Speeds

For more detailed instructions on the *Analysis Package*'s additional features and tools, select "Help" from the menu bar in the *Analysis Package*.

## 4.2 determining flow rate

This example uses data that was collected in one of *Traffic Tracker*'s environment templates named "Simple Four-Way Intersection" (Figure 4.1). You could use this template as is for your data collection, you could modify it to your situation, or you could create an entirely new environment for your intersection modeled on this one.




### 4.2.1 Ope

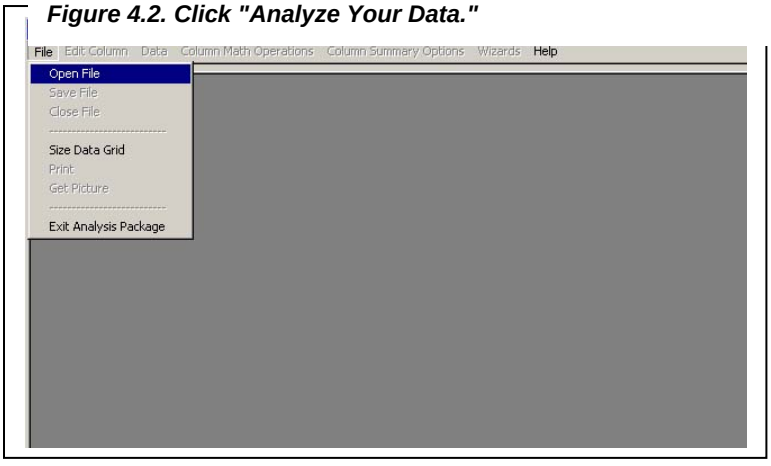
Begin by ope
(Figure 4.2).

***Figure 4.1. Simple Four-Way Intersection data collection environment template.***

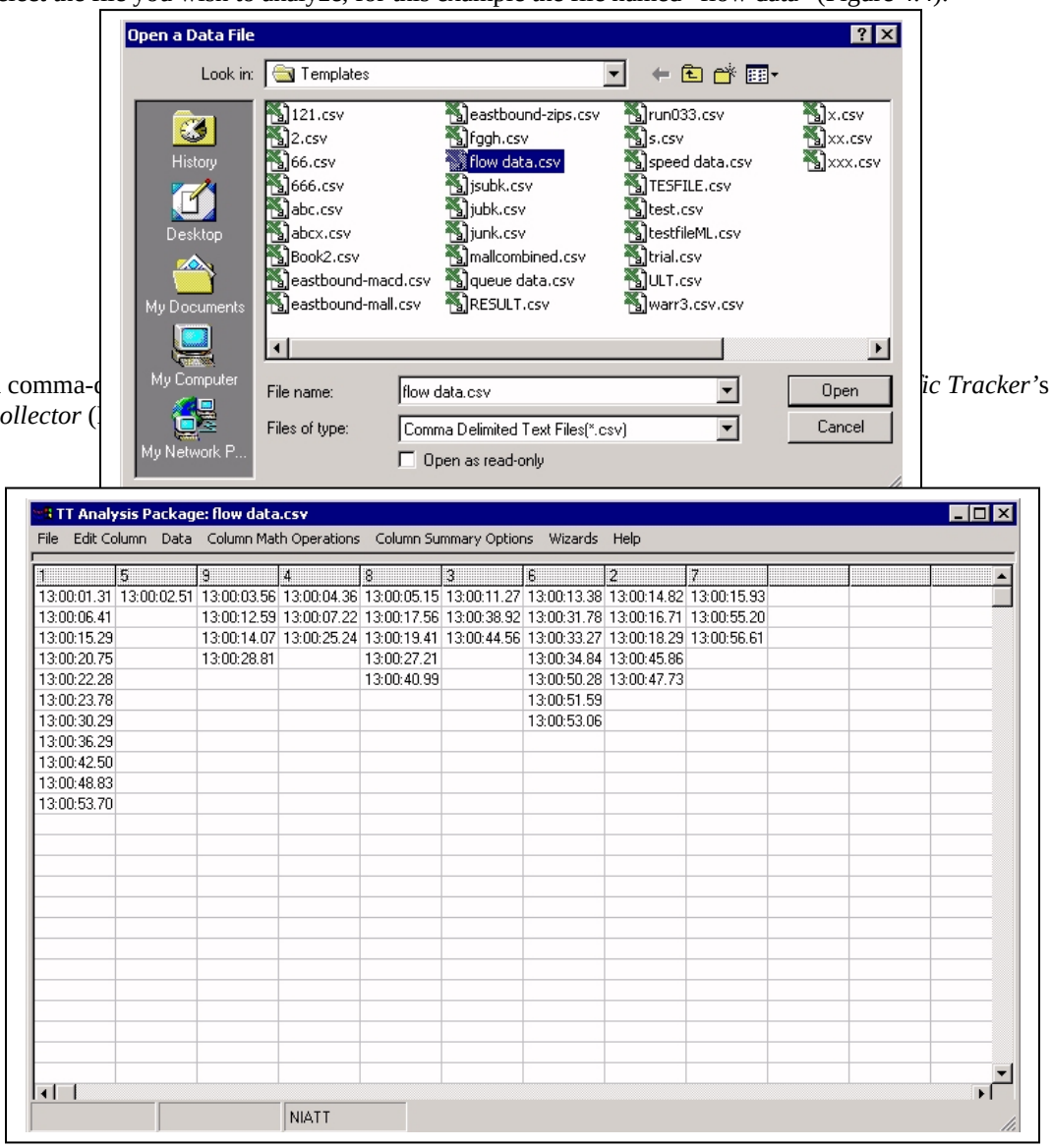
### 4.2.2 S

The *Traf* select “Open File.”

***Figure 4.2. Click "Analyze Your Data."***



Select the file you wish to analyze, for this example the file named “flow data” (Figure 4.4).




A comma-d ic Tracker’s *Data Collector* (

| 1 | 5 | 9 | 4 | 8 | 3 | 6 | 2 | 7 |
|---|---|---|---|---|---|---|---|---|
| 13:00:01.31 | 13:00:02.51 | 13:00:03.56 | 13:00:04.36 | 13:00:05.15 | 13:00:11.27 | 13:00:13.38 | 13:00:14.82 | 13:00:15.93 |
| 13:00:06.41 | | 13:00:12.59 | 13:00:07.22 | 13:00:17.56 | 13:00:38.92 | 13:00:31.78 | 13:00:16.71 | 13:00:55.20 |
| 13:00:15.29 | | 13:00:14.07 | 13:00:25.24 | 13:00:19.41 | 13:00:44.56 | 13:00:33.27 | 13:00:18.29 | 13:00:56.61 |
| 13:00:20.75 | | 13:00:28.81 | | 13:00:27.21 | | 13:00:34.84 | 13:00:45.86 | |
| 13:00:22.28 | | | | 13:00:40.99 | | 13:00:50.28 | 13:00:47.73 | |
| 13:00:23.78 | | | | | | 13:00:51.59 | | |
| 13:00:30.29 | | | | | | 13:00:53.06 | | |
| 13:00:36.29 | | | | | | | | |
| 13:00:42.50 | | | | | | | | |
| 13:00:48.83 | | | | | | | | |
| 13:00:53.70 | | | | | | | | |

***Figure 4.5. Simple Four-Way Intersection data file.***

### 4.2.3 Open the Flow Wizard

With the data file open, select “Wizards” and ” Find Interval Flow Rate” from the menu bar (Figure 4.6).

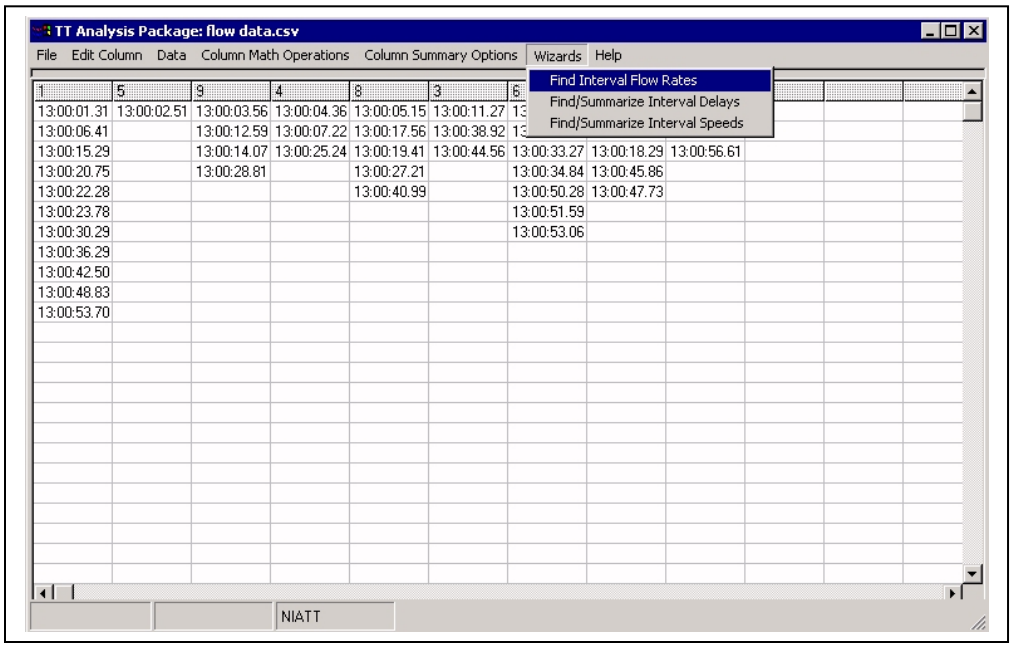



***Figure 4.6. Select "Find Interval Flow Rate."***

### 4.2.4 Specify parameters for determining flow rate

When you select the Flow wizard from the menu bar, the following screen will display (Figure 4.7). Use this screen to specify all the parameters for determining flow rate.

First, specify the columns containing events for which you want to determine flow rates. Begin by clicking the "Insert" button.

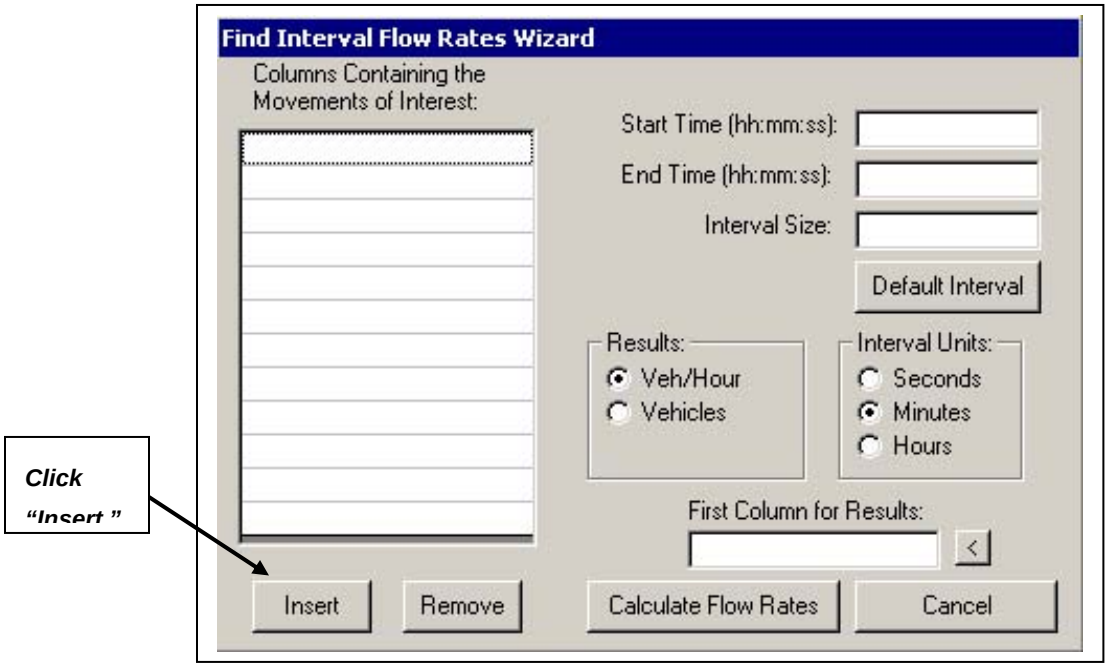



***Figure 4.7. Click "Insert" to specify columns.***

When you click “Insert,” the following dialog box will display (Figure 4. 8), allowing you to specify a column containing a movement event time.

There are two ways to specify a column. You can either type the column name in the blank field, or click the arrow to the right of the field. If you click the arrow, the insert screen will disappear, allowing you to select the column of interest in the data file. Once you click on a column, the insert screen will reappear, with the column name entered in the field.

When you have entered the column, click “Insert.”

***Figure 4.8.Type in column name or click arrow to select column and enter its name.***

After you click Insert, the Flow Rates wizard will reappear with the column’s name inserted in the Movements of Interest list (Figure 4.9). You can determine the flow rates for up to 12 separate movements at one time by clicking “Insert” to select and add each additional column. Delete a column from the list by selecting the column and clicking “Remove.”

Once you have selected all the columns you want to analyze, the wizard will automatically enter the start time and end time, encompassing all of the events in the selected columns. You may also enter a set of start and end times different than the times selected by the program.

Then, enter an interval size, or click the "Default Interval" button to have the program insert an interval for you, and then select the Interval Units.

Next, select the type of report under Results, and enter the first column in which you would like the results to appear.

Finally, click "Calculate Flow Rates" to begin the summary process.

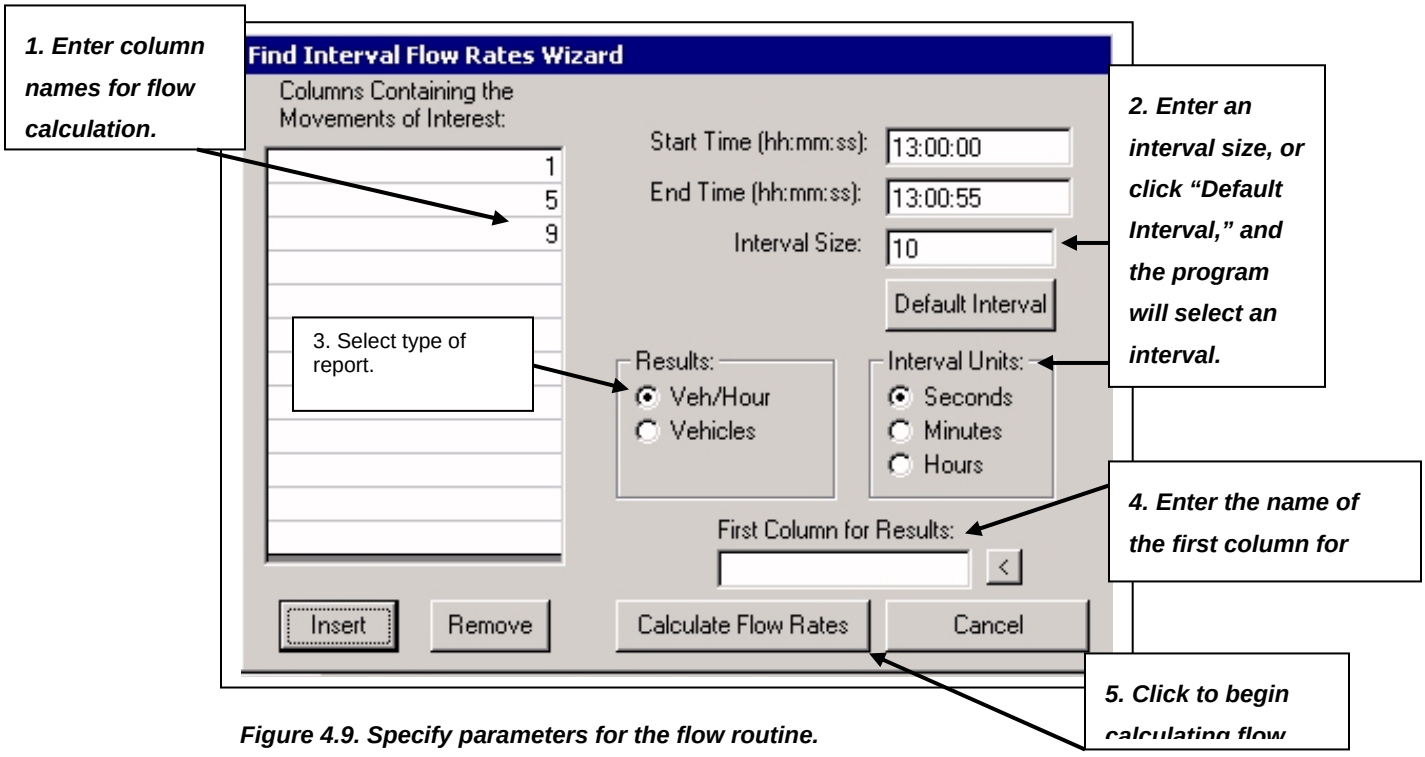
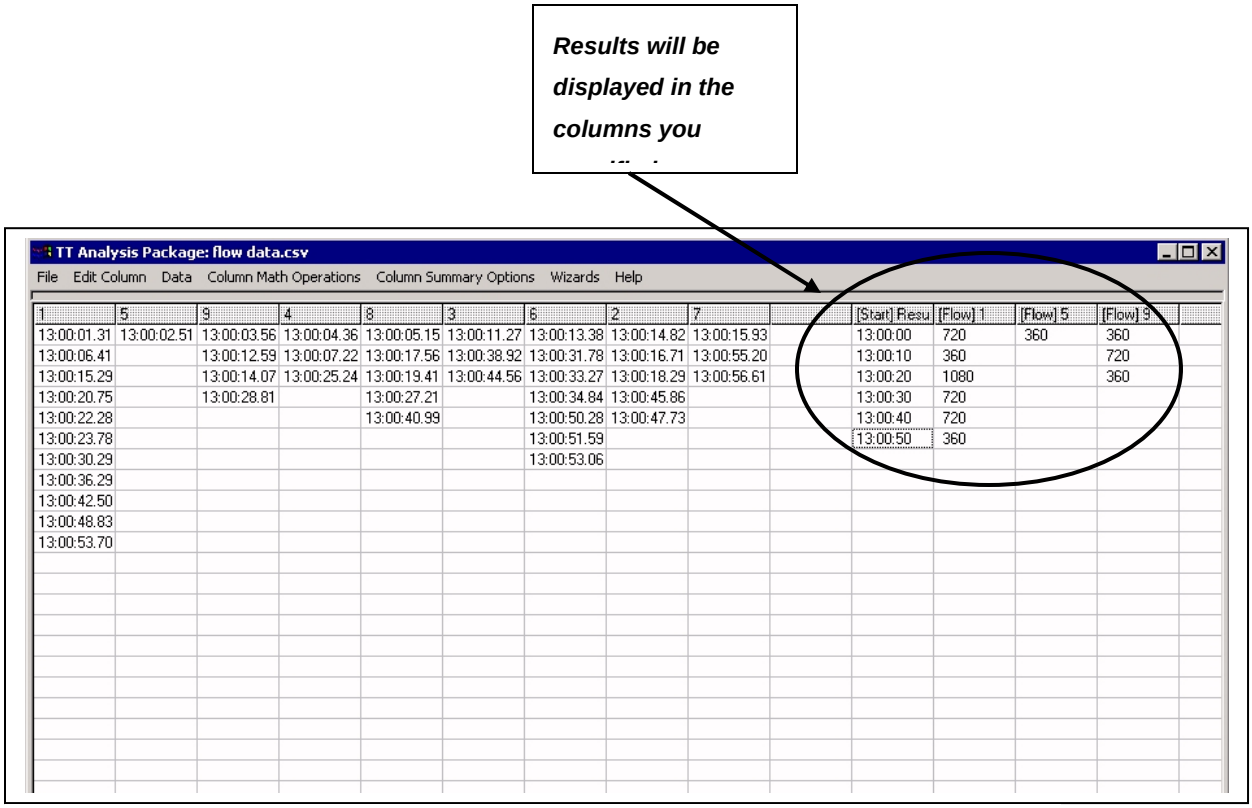



***Figure 4.9. Specify parameters for the flow routine.***

### *4.2.5 Calculate flow rates*

When you click "Calculate Flow Rates," the summary process will begin. Summary calculations are performed for each interval. The start time for each interval will be placed in the results column that you specified (Figure 4.10). The summary information for the various flow rates will be placed in the adjacent columns on the same row as the interval's start time.

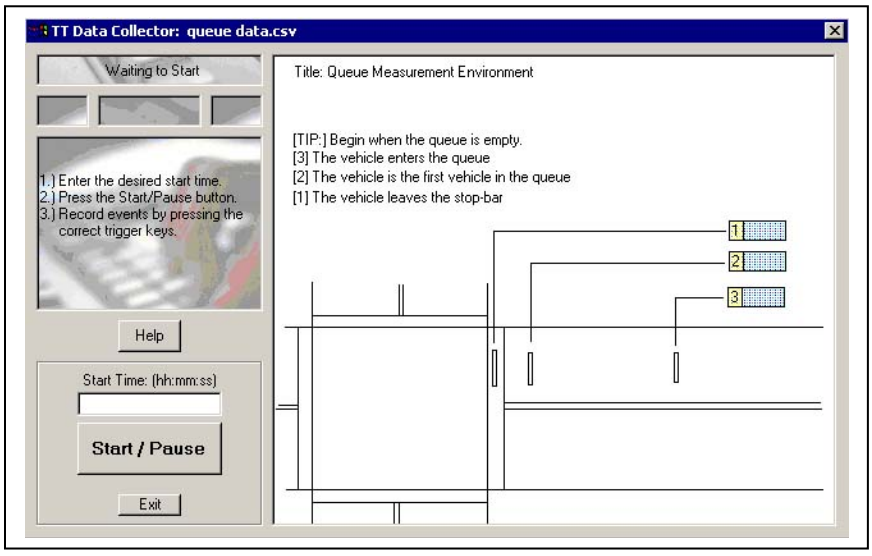



| 1 | 5 | 9 | 4 | 8 | 3 | 6 | 2 | 7 | [Start] Resu | [Flow] 1 | [Flow] 5 | [Flow] 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 13:00:01.31 | 13:00:02.51 | 13:00:03.56 | 13:00:04.36 | 13:00:05.15 | 13:00:11.27 | 13:00:13.38 | 13:00:14.82 | 13:00:15.93 | 13:00:00 | 720 | 360 | 360 |
| 13:00:06.41 | | 13:00:12.59 | 13:00:07.22 | 13:00:17.56 | 13:00:38.92 | 13:00:31.78 | 13:00:16.71 | 13:00:55.20 | 13:00:10 | 360 | | 720 |
| 13:00:15.29 | | 13:00:14.07 | 13:00:25.24 | 13:00:19.41 | 13:00:44.56 | 13:00:33.27 | 13:00:18.29 | 13:00:56.61 | 13:00:20 | 1080 | | 360 |
| 13:00:20.75 | | 13:00:28.81 | | 13:00:27.21 | | 13:00:34.84 | 13:00:45.86 | | 13:00:30 | 720 | | |
| 13:00:22.28 | | | | 13:00:40.99 | | 13:00:50.28 | 13:00:47.73 | | 13:00:40 | 720 | | |
| 13:00:23.78 | | | | | | 13:00:51.59 | | | 13:00:50 | 360 | | |
| 13:00:30.29 | | | | | | 13:00:53.06 | | | | | | |
| 13:00:36.29 | | | | | | | | | | | | |
| 13:00:42.50 | | | | | | | | | | | | |
| 13:00:48.83 | | | | | | | | | | | | |
| 13:00:53.70 | | | | | | | | | | | | |

***Figure 4.10. Summary report for flow rate.***

### *4.3 DETERMINING DELAY*

This example uses data collected in one of *Traffic Tracker*'s environment templates named "Queue Measurement Template" (Figure 4.11). You could use this template as is for your data collection, you could modify it to your situation, or you could create an entirely new environment for your intersection modeled on this one.




## *4.3.1 Open Analysis Package*

If *Traffic Tracker*'s analysis function is not already open, click "Analyze Your Data" on the main menu (Figure 4.12).

### 4.3.2 Sele

The *Traffic T* ” select “Open File.”

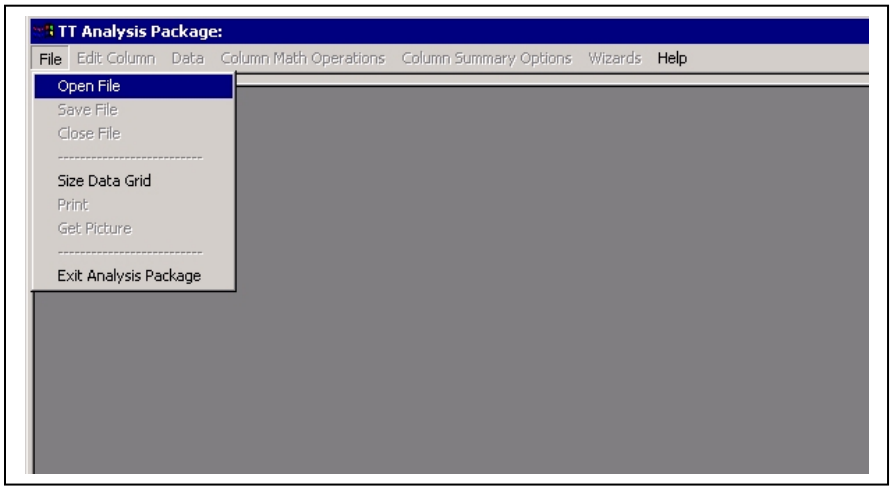



***Figure 4.13. Select "Open File."***

Select the file you wish to analyze, for this example “queue data” (Figure 4.14).

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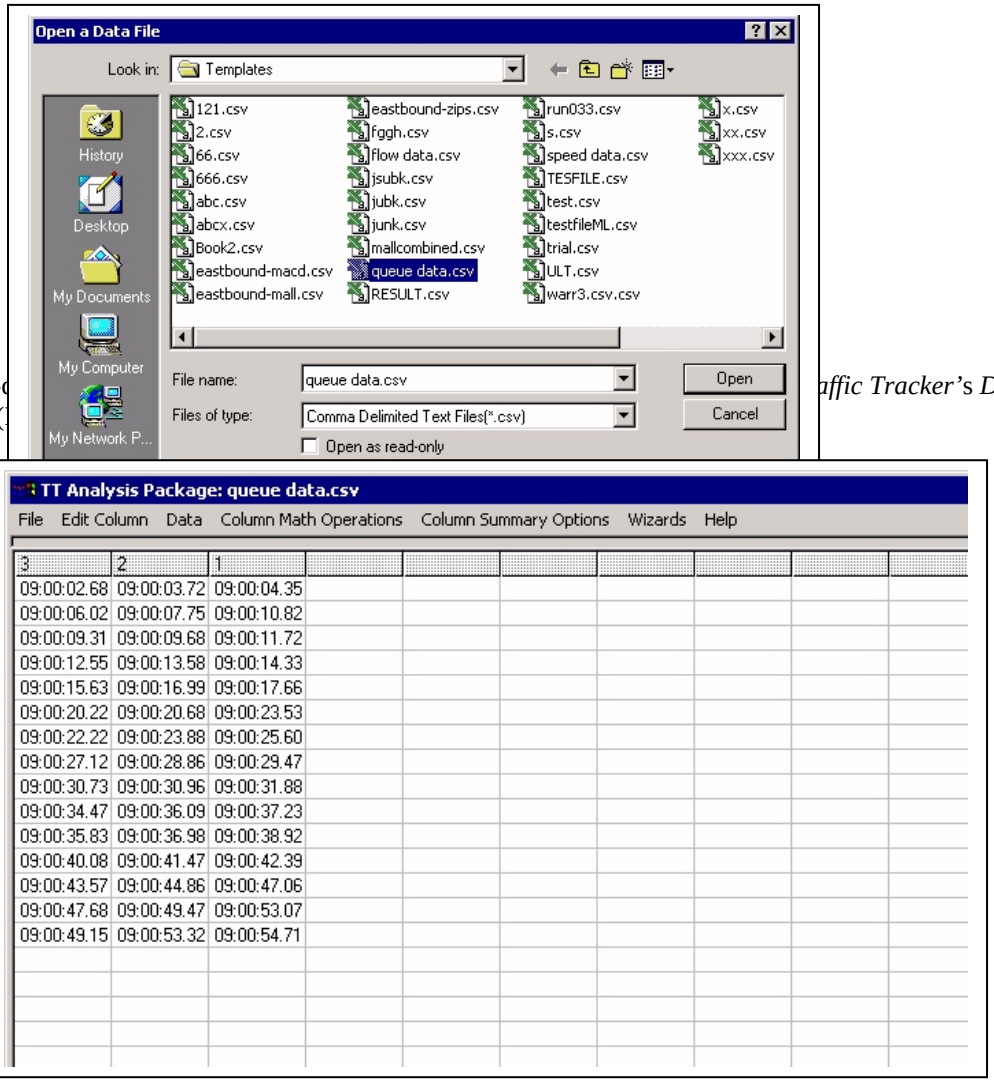



| 3 | 2 | 1 |
|---|---|---|
| 09:00:02.68 | 09:00:03.72 | 09:00:04.35 |
| 09:00:06.02 | 09:00:07.75 | 09:00:10.82 |
| 09:00:09.31 | 09:00:09.68 | 09:00:11.72 |
| 09:00:12.55 | 09:00:13.58 | 09:00:14.33 |
| 09:00:15.63 | 09:00:16.99 | 09:00:17.66 |
| 09:00:20.22 | 09:00:20.68 | 09:00:23.53 |
| 09:00:22.22 | 09:00:23.88 | 09:00:25.60 |
| 09:00:27.12 | 09:00:28.86 | 09:00:29.47 |
| 09:00:30.73 | 09:00:30.96 | 09:00:31.88 |
| 09:00:34.47 | 09:00:36.09 | 09:00:37.23 |
| 09:00:35.83 | 09:00:36.98 | 09:00:38.92 |
| 09:00:40.08 | 09:00:41.47 | 09:00:42.39 |
| 09:00:43.57 | 09:00:44.86 | 09:00:47.06 |
| 09:00:47.68 | 09:00:49.47 | 09:00:53.07 |
| 09:00:49.15 | 09:00:53.32 | 09:00:54.71 |

***Figure 4.15. Queue data text file.***

### 4.3.3 Open the Delay Wizard

With the data file open, select “Wizards” and ” Find/Summarize Interval Delays” from the menu bar (Figure 4.16).

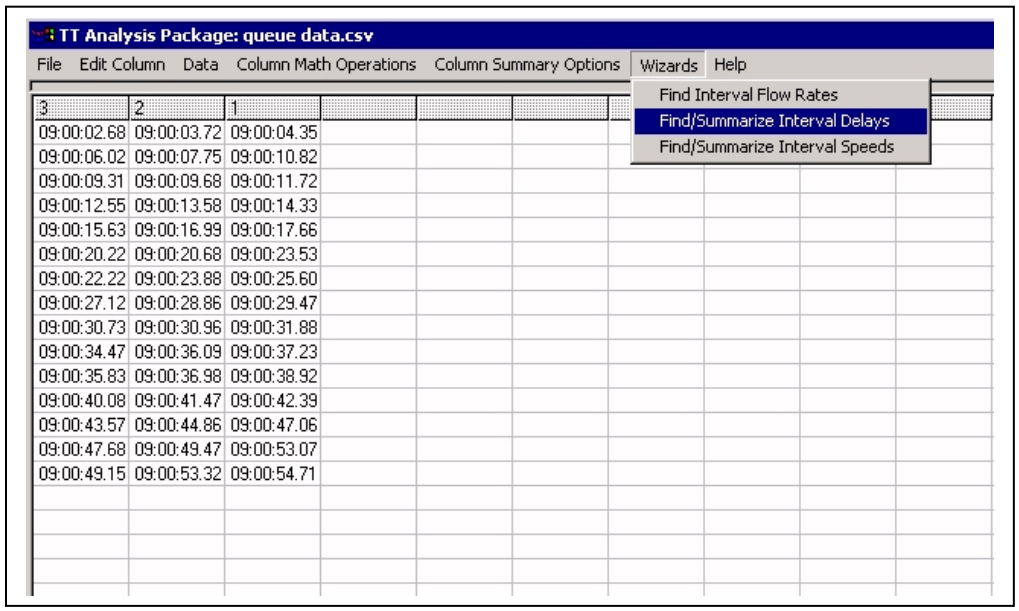
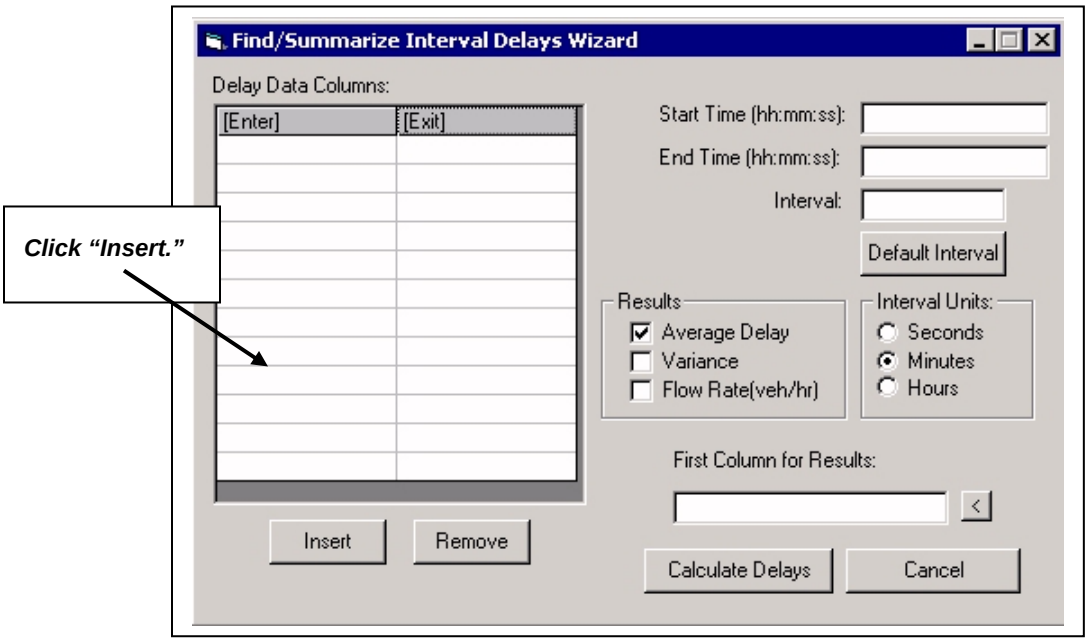



***Figure 4.16. Select “Find/Summarize Interval Delays.”***

### *4.3.4 Specify parameters for determining delay*

When you select the Delay wizard from the menu bar, the following screen will display (Figure 4.17). Use this screen to specify all the parameters for determining delay.
First, specify the columns containing events for which you want to determine delay by clicking the "Insert" button.



When you click “Insert,” the following dialog box will display (Figure 4.18), allowing you to specify columns containing movement event times.

There are two ways to specify a column. You can either type the column name in the blank field, or click the arrow to the right of the field. If you click the arrow, the insert screen will disappear, allowing you to select the column of interest in the data file. Once you click on a column, the insert screen will reappear, with the column name entered in the field.

When you have entered the columns you wish to analyze, click “Insert.”

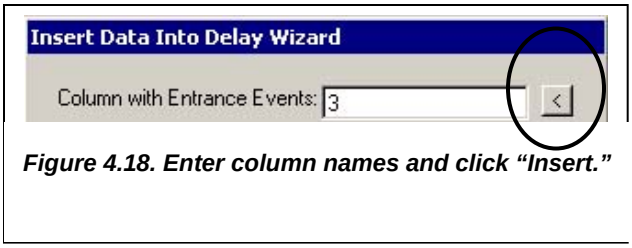



***Figure 4.18. Enter column names and click “Insert.”***

After you specify a column, the column’s name will appear in the Delay Data Columns list (Figure 4.19). You can determine the delay for up to 12 separate movements at one time by clicking “Insert” to add the name of each additional column. Delete a column from the list by selecting the column and clicking “Remove.”

Once you have selected all the columns you want to analyze, the wizard will automatically enter the start time and end time, encompassing all of the events in the selected columns. You may also enter a set of start and end times different than the times selected by the program.

Then, enter an interval, or click the "Default Interval" button to have the program insert an interval for you, and select the Interval Units.

Next, select the type of report under "Results," and enter the first column in which you would like the results to appear.

Finally, click "Calculate Delays" to begin the summary process.

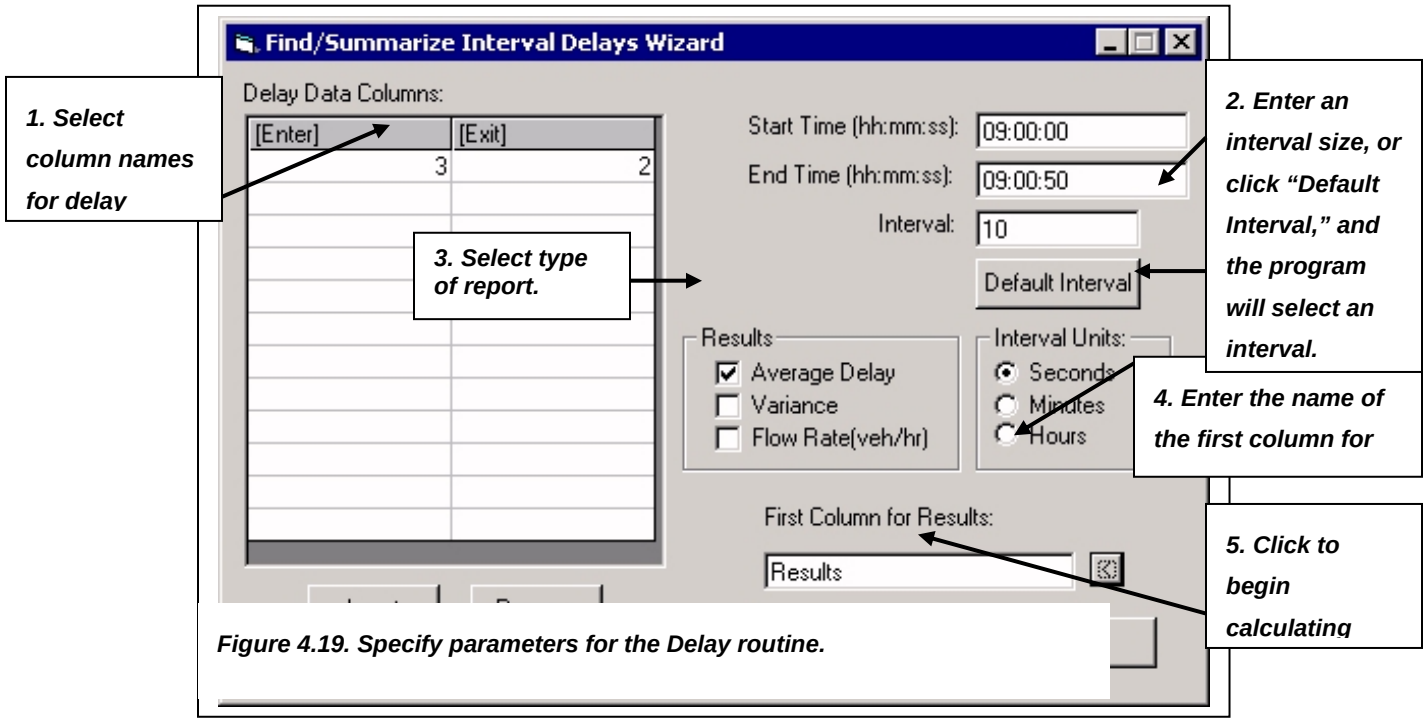
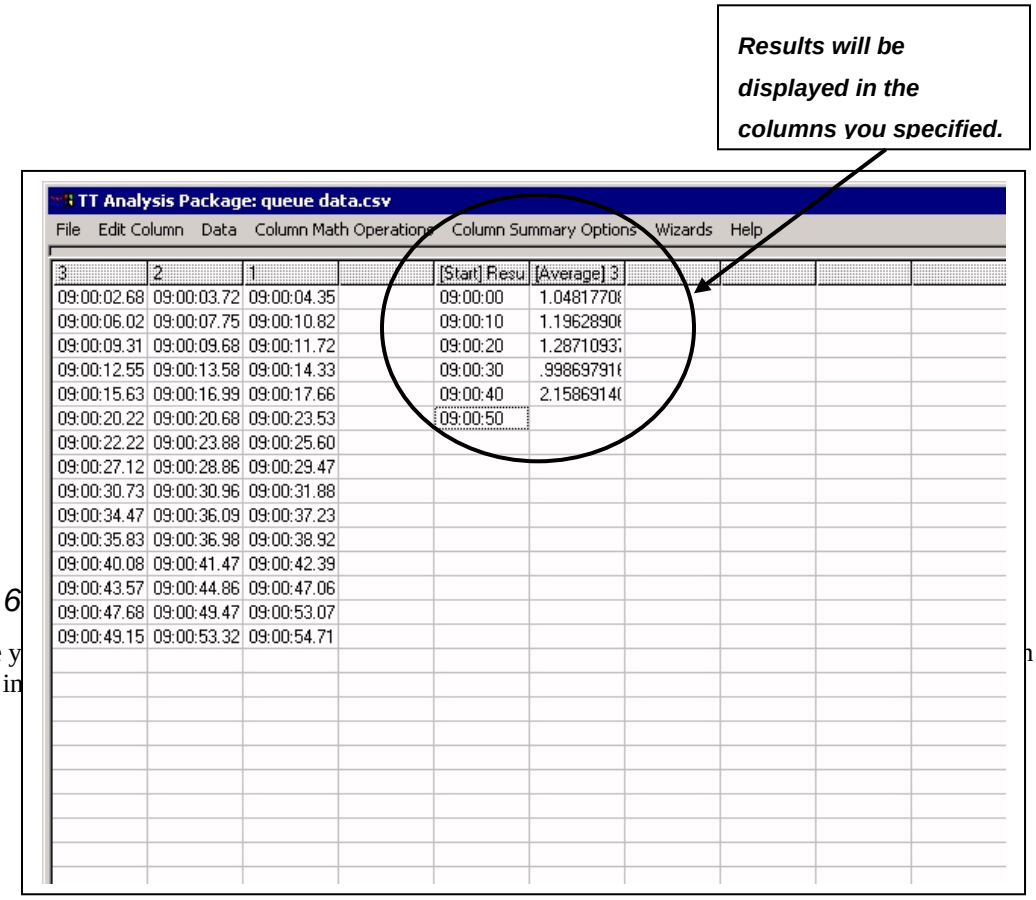



***Figure 4.19. Specify parameters for the Delay routine.***

### 4.3.5 Calculate delay

When you click “Calculate Delays,” the summary process will begin. Summary calculations are performed for each interval. The start time for each interval will be placed in the results column that you specified (Figure 4.20). The summary information for the various delays will be placed in the adjacent columns on the same row as the interval’s start time.



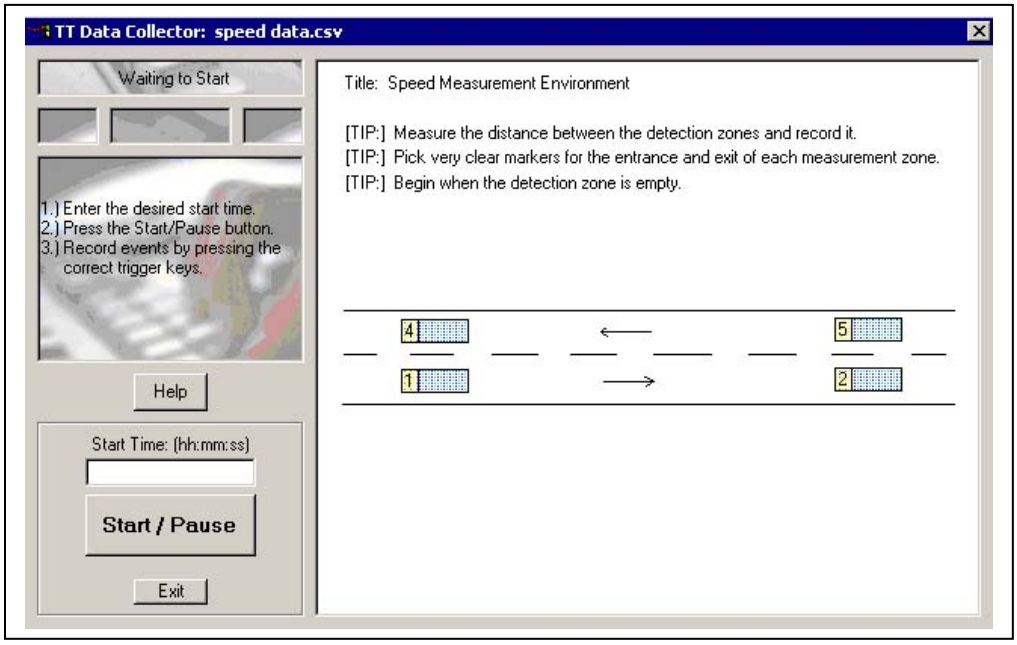

### 4.3.6

Save y h be read in

***Figure 4.20. Summary report for delay.***

## *4.4 determining vehicle speeds*

This example uses data collected in one of *Traffic Tracker*'s environment templates named "Speed Measurement Template" (Figure 4.21). You could use this template as is for your data collection, you could modify it to your situation, or you could create an entirely new environment for your intersection modeled on this one.




### *4.4.1 Open Analysis Package*

If *Traffic Tracker*'s analysis function is not already open, click "Analyze Your Data" on the main menu (Figure 4.22).

***Click "Analyze Your Data" to access the***

### 4.4.2 Se

The *Traffic* ” select “Open File.”

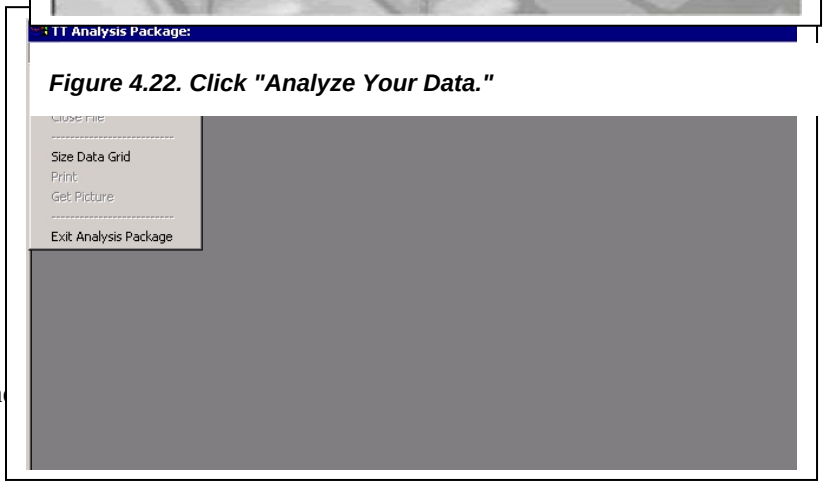



***Figure 4.22. Click "Analyze Your Data."***

Select th

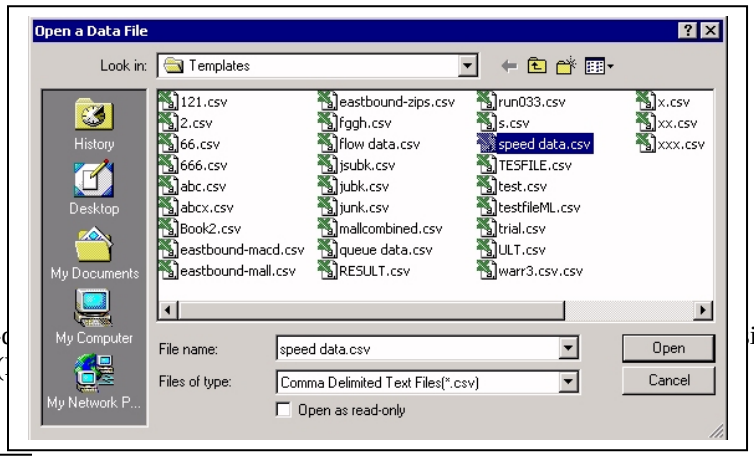



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***Figure 4.24. Select the file to analyze.***

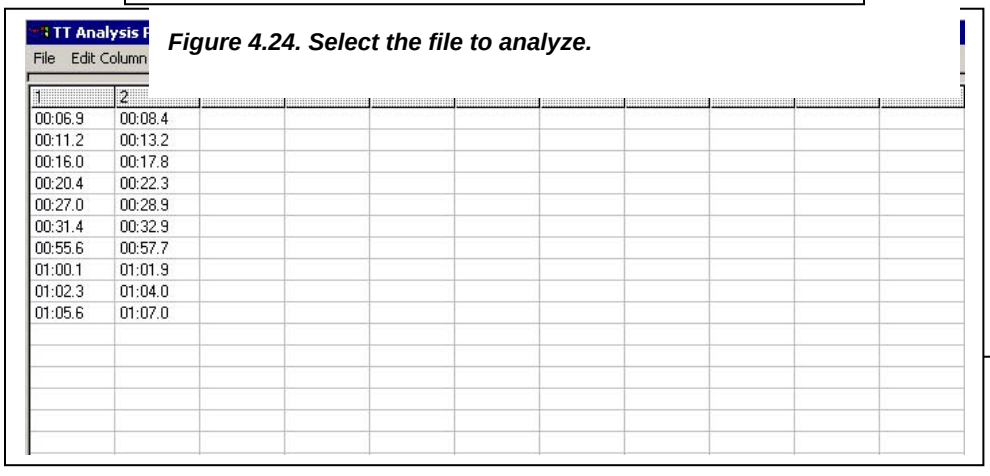





***Figure 4.25. Speed data file.***

### 4.4.3 OPEN THE SPEED WIZARD

With the data file open, select “Find/Summarize Interval Speeds” from the menu bar (Figure 4.26).

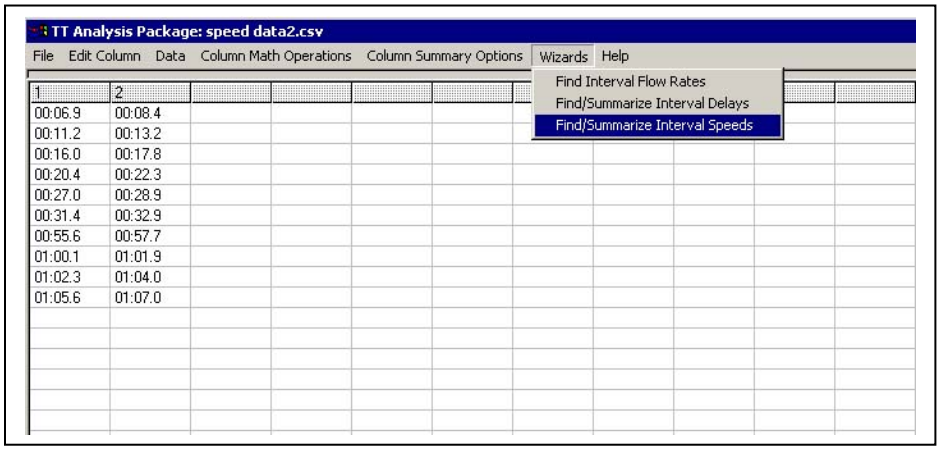
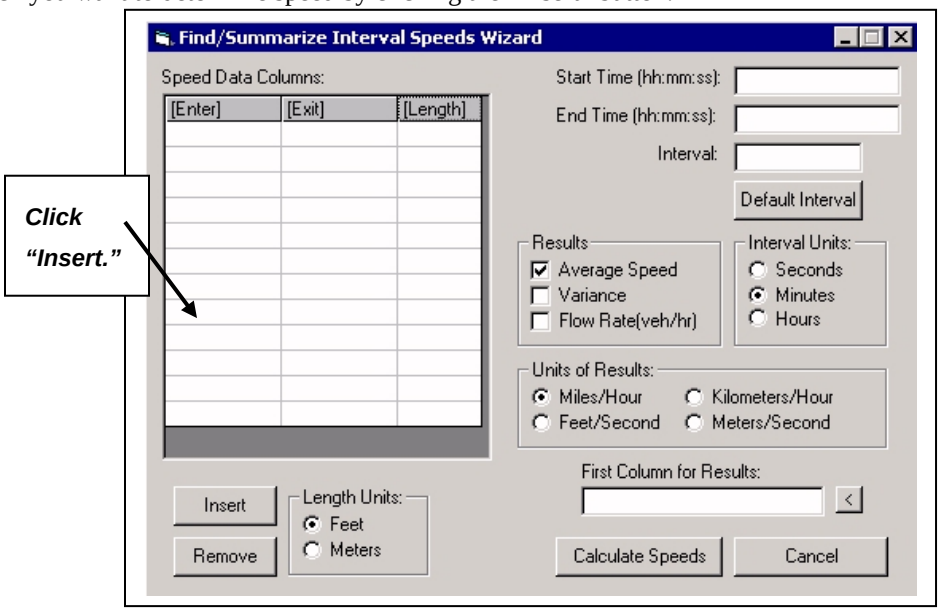



***Figure 4.26. Select “Find/Summarize Interval Speeds.”***

### 4.4.4 SPECIFY PARAMETERS FOR DETERMINING SPEED

When you select the Speed wizard from the menu bar, the following screen will display (Figure 4.27). Use this screen to specify all the parameters for the routine. First, select the columns containing events for which you want to determine speed by clicking the "Insert" button.



When you click “Insert,” the following dialog box will display (Figure 4.28), allowing you to specify columns containing entrance and exit events for a particular speed trap, plus the length of the speed trap, including the foot, ( ‘ ) mark.

There are two ways to specify a column. You can either type the column name in the blank field, or click the arrow to the right of the field. If you click the arrow, the insert screen will disappear, allowing you to select the column of interest in the data file. Once you click on a column, the insert screen will reappear, with the column name entered in the field.

When you have entered the columns you wish to analyze and the length of the speed trap, click “Insert.”

***Figure 4.28. Specify columns and length of speed trap.***

After you specify igure 4.29). You can find the s name of each additional column n and clicking “Remove.”

Once you have selected all the columns you want to analyze, the wizard will automatically enter the start time and end time, encompassing all of the events in the selected columns. You may also enter a set of start and end times different than the times selected by the program.

Next, enter an interval, or click the "Default Interval" button to have the program insert an interval for you, and select Interval Units.

Then, select the type of report you want under "Results," and the units of the results.

Then specify the length units for the speed traps, and enter the first column in which you would like the results to appear.

Finally, click "Calculate Speeds" to begin the summary process.

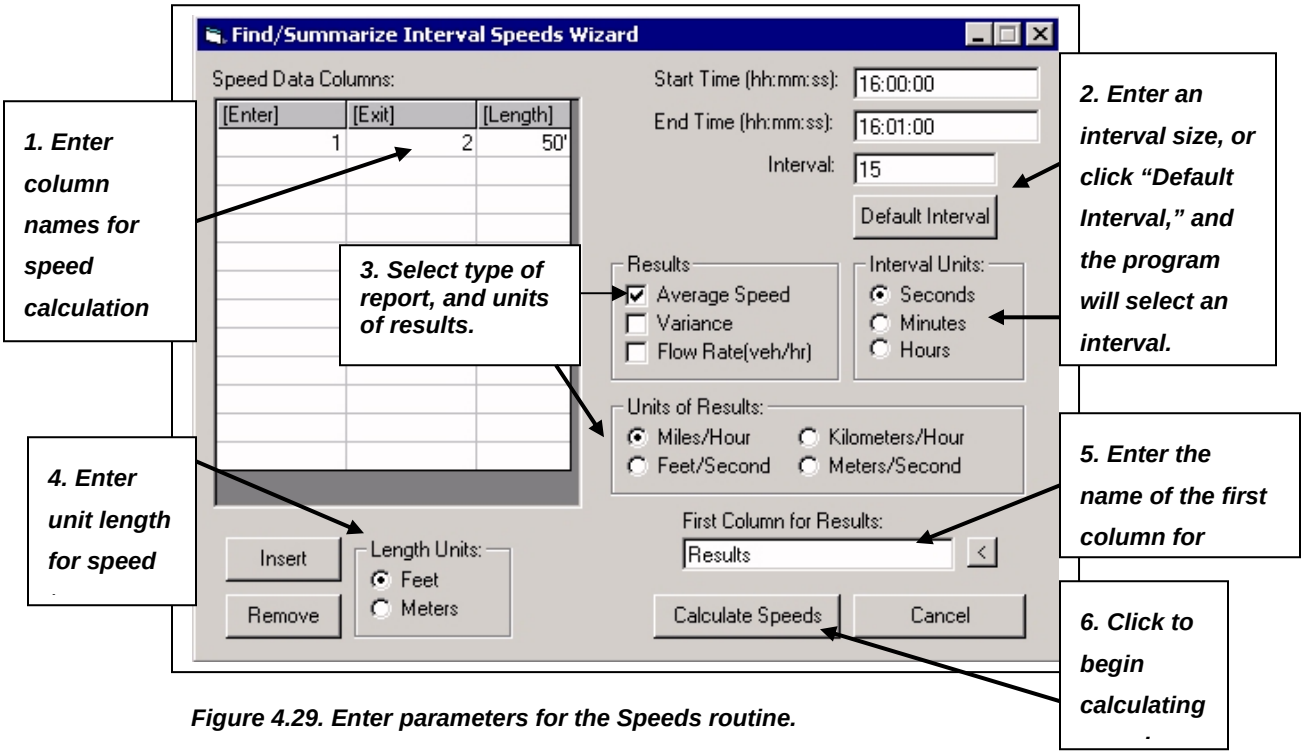



***Figure 4.29. Enter parameters for the Speeds routine.***

### *4.4.5 Determine speeds*

When you click "Calculate Speeds," the summary process will begin. Summary calculations are performed for each interval. The start time for each interval will be placed in the results column that you specified (Figure 4.30). The summary information for the various speed traps will be placed in the adjacent columns on the same row as the interval's start time.

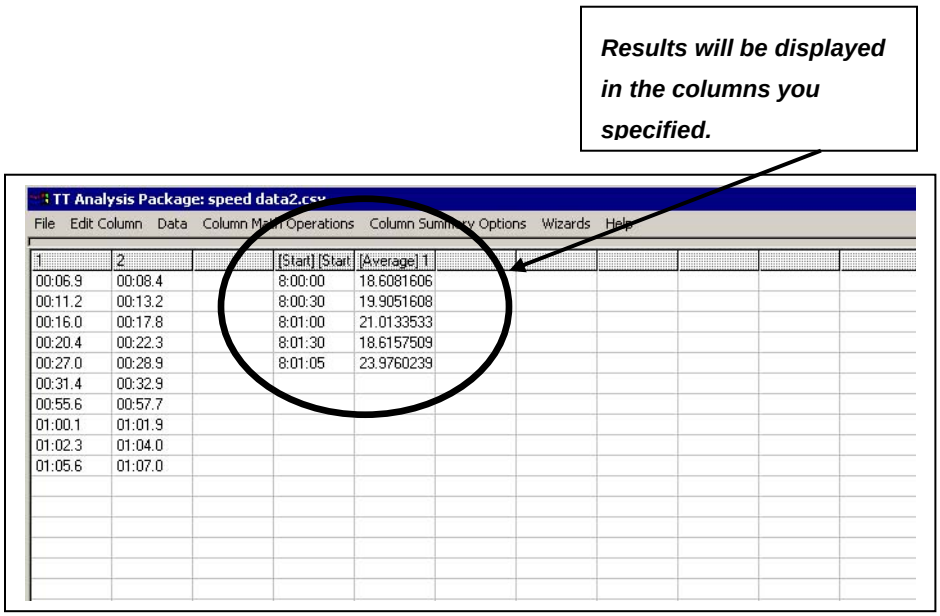



***Figure 4.30. Summary report for speed.***

### *4.4.6 Save your data*

Save your data by selecting “File,” and “Save File.” The data will be saved in .csv format, which can be read in *Excel* or any other spreadsheet.

## *4.5. Exit the Analysis package*

When you are finished summarizing your data, exit the *Analysis Package* by selecting “File,” and “Exit Analysis Package” from the main menu bar (Figure 4.31).

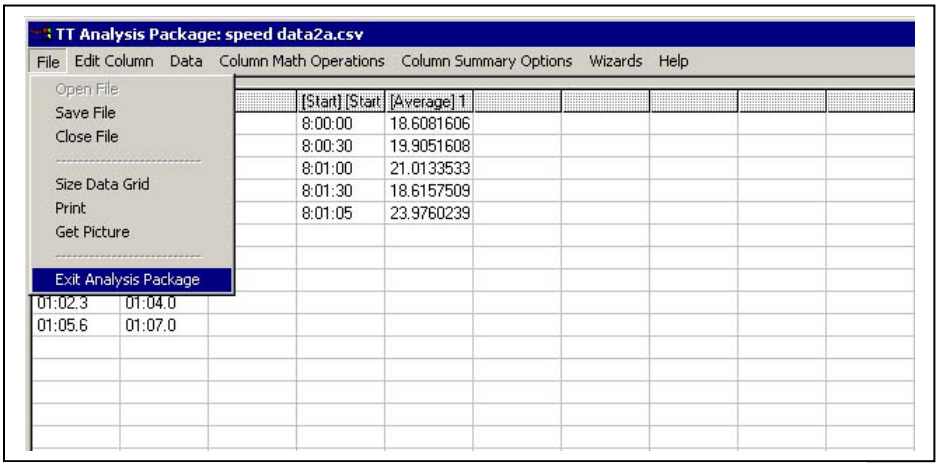



***Figure 4.31. Exit Analysis Package.***

## 4.6 Exit Traffic Tracker

When you click "Exit Analysis Package," the *Analysis Package* will close and you will return to the main *Traffic Tracker* screen (Figure 4.32). To exit the program, click "Exit Traffic Tracker."

***Figure 4.32. Click to exit Traffic Tracker.***